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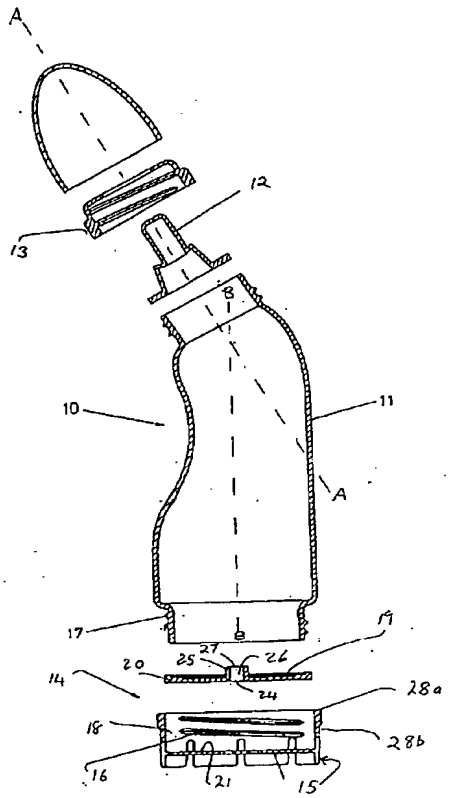
(54) **BIBERON POURVU D'UNE SOUPAPE**
(54) **FEEDING BOTTLE AND VALVE MEMBER FOR USE THEREIN**



(57) Biberon (10) pourvu d'une soupape d'entrée d'air (14) servant à équilibrer la pression externe et la pression interne, tout en évitant une contamination ou une perte du contenu. L'entrée d'air comprend une soupape déformable (20) présentant une saillie perforée (25) qui favorise l'ouverture et la fermeture de la soupape. La soupape est retenue par un dispositif rigide (15) présentant une ouverture (partielle) correspondante (22, 23).

(57) A feeding bottle (10) with an air inlet valve (14) to equalize external and internal pressure but prevent contamination or loss of contents. The air inlet uses a deformable valve member (20) with an apertured protrusion (25) to enhance valve opening and closing, the valve means retained by a rigid means (15) having a corresponding (partial) aperture (22, 23).

ABSTRACT

A feeding bottle (10) with an air inlet valve (14) to equalize external and internal pressure but prevent contamination or loss of contents. The air inlet uses a deformable valve member (20) with an apertured protrusion (25) to enhance valve opening and closing, the valve means retained by a rigid means (15) having a corresponding (partial) aperture (22, 23).

FEEDING BOTTLE AND VALVE MEMBER FOR USE THEREIN

FIELD OF THE INVENTION

The present invention is directed to a feeding bottle and to a valve member for use therein.

BACKGROUND OF THE INVENTION

In known feeding bottles, a baby sucks milk or some other liquid through a teat. As the baby sucks, the pressure inside the bottle is reduced to a level below atmospheric pressure and it becomes difficult for the baby to continue to suck liquid out of the bottle. It therefore becomes necessary to periodically interrupt the baby's feeding to allow the pressure inside the bottles to return to atmospheric pressure to enable feeding to continue.

A feeding bottle is disclosed in UK patent No. 2238729 in which the end of the bottle remote from the teat is provided with an air inlet valve. The air inlet valve comprises a resiliently deformable valve sheet member having a slit formed therein such that when the valve is in a closed position, the sheet member is generally flat causing the slit to be forced closed, while when the valve is in an open position, the sheet member curves inward to cause the slit to open.

This bottle suffers from the drawback that when the pressure inside the bottle is greater than atmospheric pressure, for example when the bottle containing milk is placed in hot water in order to heat the milk, the pressure inside the bottle sometimes causes inside of the bottle to be exuded outward through the air inlet valve.

Preferred embodiments of the present invention seek to overcome this disadvantage of the prior art.

BRIEF SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a valve member for a feeding bottle, the valve member comprising:

a resiliently deformable sheet having at least one aperture extending therethrough from a first side to a second side thereof; and

a respective protrusion surrounding the aperture or each of said apertures, and arranged on the first side of said sheet, wherein the protrusion or each of said protrusions is provided with a slit such that a pressure difference acting from said first to said second side causes the slit, or each of said slits, to tend to close, and a pressure difference acting from said second to said first side causes the slit, or each slit, to tend to open to allow one way air flow through the aperture, or each aperture, in use.

By providing one or more protrusions arranged on one side of the valve member, this has the advantage of enabling the effect of pressure drops inside the bottle in use to be minimized, while also minimizing the exit of liquid out of the bottle.

Preferably, said sheet and/or the protrusion, or each said protrusion, is formed substantially of an elastomer such as rubber.

Preferably, the protrusion or each said protrusion, has a hollow interior and said corresponding slit is arranged at an end of the protrusion remote from said sheet.

Preferably, the protrusion or each said protrusion, has side walls converging in a direction towards said corresponding slit.

This has the advantage of enabling the valve member to be constructed such that pressure acting so as to close the slit, or each slit, compresses the interior of the protrusion, or each protrusion, to enhance the slit-closing effect.

The valve member may comprise a single said aperture arranged substantially centrally of said sheet.

By providing a single aperture arranged generally centrally of the valve member, this has the advantage of enabling the flexibility of the sheet to be used to maximum effect.

According to another aspect of the present invention, there is provided a bottle comprising:

a hollow body having a first end adapted to receive a teat and a second end remote from said first end; and

an air inlet valve arranged in use at said second end, wherein the air inlet valve comprises a rigid retaining member for accommodating a valve member as defined above such that the protrusion, or each protrusion, faces the interior of the body, and the retaining member has a respective aperture therethrough cooperating with the aperture, or each said aperture, of the valve member in use. The retaining member has a screw thread which cooperates in use with a screw thread on the second end of the body.

In a preferred embodiment, the retaining member comprises a plate member partially covering the aperture or each aperture, therethrough.

By partially covering the aperture, or each aperture, the ingress of larger pieces of foreign matter such as dirt is minimized.

The bottle may further comprise protection means for protecting the retaining member and/or valve member from the environment.

Preferably the protection means comprises a substantially cylindrical member adapted to slidably fit over the retaining member.

Since feeding bottles are often constructed in such a way as to be able to be stood upright on their ends remote from the teat to enable the bottle to be put down with one hand while preventing liquid spillage, this has the advantage of enabling the bottle to be constructed in this way also while minimizing ingress of environmental substances such as damp.

The retaining member preferably has a protruding portion adapted to abut against the protection means.

In a preferred embodiment, the axis of the first end extends at an angle to the axis of the second end.

This has the advantage of enabling the bottle to have a particularly ergonomic construction.

BRIEF DESCRIPTION OF THE DRAWINGS

As an aid to understanding the invention, a preferred embodiment thereof will now be described, by way of example only and not in any limitative sense, with reference to the accompanying drawings, in which:

Figure 1 is a cross sectional, elevation view of a feeding bottle embodying the present invention;

Figure 2a is a plan view of a retaining member of an air inlet valve of the bottle of Figure 1;

Figure 2b is a cross sectional elevation view on the line IIb-IIb of the retaining member of Figure 2a;

Figure 3a is a view from below of a valve member of the air inlet valve of the bottle of Figure 1;

Figure 3b is a cross sectional elevation view on the line IIIb-IIIb of the valve member of Figure 3a;

Figure 3c is a cross section elevation view on the line IIIc-IIIc of the valve member of Figure 3a, and

Figure 4 is a schematic representation of a protection means for use with the bottle of Figure 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring in detail to Figure 1, a feeding bottle 10 has a body 11 formed from glass, plastics or the like and adapted to receive a teat 12 at one end thereof. The body 11 is so shaped that the longitudinal axis A-A thereof at the upper end as shown in Figure 1 extends at an angle to the longitudinal axis B-B at the lower end. This serves to enable a person feeding a baby to present the teat 12 to the baby's mouth while at the same time keeping the hand holding the bottle 10 close to the body, thus minimizing discomfort. The teat is fitted to the bottle in a conventional manner by clamping the teat between the body 11 and a threaded cap 13 which cooperates with a thread on the body 11. An air inlet valve 14 is provided at the other end of the body 11 remote from the teat 12.

The air inlet valve 14 is shown in greater detail in Figures 2 and 3 and comprises a rigid retaining member 15 in the form of a cap of plastics material and having a screw thread 16 for cooperating with a corresponding thread on 17 the end of the body 11.

The retaining member 15 forms a recess 18 for receiving a resiliently deformable valve member 19 of suitable material such as rubber, such that a generally circular disc 20 of the valve member 19 can be arranged with one side thereof flush with an end surface 21 of the retaining member 15.

The retaining member 15 and valve member 19 each have an aperture arranged generally centrally therein. The aperture 22 in the retaining member 15 is generally circular with diameter of approximately 4mm and contains a central disc member 23 so that the aperture is formed by two arcuate portions. The disc member 23 serves to minimize ingress of dirt into the bottle 10 and also maintains rigidity of the valve member 19 when it is flush with the retaining member 15.

The aperture in the valve member 19 is formed in the disc 20 thereof and a centrally arranged protrusion 25 extends from the aperture 24 on the side of the valve member 19 facing away from the retaining member 15 (i.e. the side thereof facing towards the interior of the body 11.) The aperture 24 in the valve member 19 is generally rectangular and the

protrusion 25 has side walls 25a and an end wall 25b forming a hollow interior 26 of generally rectangular cross section, the cross section area decreasing in a direction away from the disc 20. The protrusion 25 also has an end wall 25b having a slit 27 therein such that a pressure difference acting towards the outside of the body 11 from inside presses the disc 20 flat against the surface 21 of the retaining member 15 and also compresses the side walls 25a of the protrusion 25 to close the slit 27. On the other hand, a pressure difference acting from the outside towards the inside of the body 11 draws air through the aperture 22 in the retaining member 15 to cause the disc 20 to flex towards the interior of the body 11 while also tending to open the slit 27 in the end wall 25b so that air can pass through the aperture 24 in the valve member 19 to enter the bottle 10.

The retaining member 15 also has a portion 28a of increased diameter and a portion 28b of decreased diameter to allow a hollow cylindrical protective sleeve 29 as shown in Figure 4 to be slid onto the retaining member 15. This enables the bottle 10 to be stood upright on the protective sleeve 29 while preventing any dirt or undesired media such as liquids from the environment from entering the aperture 22 in the retaining member 15.

The operation of the bottle 10 will now be described.

When the bottle 10 contains liquid such as milk, it is first heated, usually by being placed in a microwave oven or into hot water. The tendency of any increase in pressure inside the bottle 10 caused by such heating to force liquid outward through the aperture 24 in the valve member 19 is counteracted by that pressure compressing the walls of the protrusion 25 and forcing the disc 20 of the valve member 19 against the end wall 21 of the retaining member 15, thus forcing the slit 27 closed.

When the baby begins to feed by sucking on the teat 12, the pressure within the bottle 10 is reduced, which in turn draw air through the aperture 22 in the retaining member 15 and causes the disc 20 of the valve member 19 to flex at its central region towards the interior of the body 11 away from the end surface 21 of the retaining member 15. This in turn causes the slit 27 to open and air to enter the bottle 10 through the slit 27 to equalize the pressures inside and outside of the bottle and enable the baby to continue feeding.

It will be appreciated by persons skilled in the art that the above embodiment has been described by way of example only and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims.

CLAIMS

We claim:

1. A valve member for a feeding bottle, comprising:

(a) a resiliently deformable sheet having an aperture from a first side to a second side of the sheet,

(b) a protrusion on said sheet, and

(c) a slit in said protrusion, forming said aperture, said slit adapted to open and close in response to a pressure differential across said sheet.

2. A valve member as recited in Claim 1, wherein said sheet is formed substantially of an elastomer.

3. A valve member as recited in Claim 1, wherein said sheet is formed substantially of rubber.

4. A valve member as recited in Claim 1, wherein said protrusion is formed substantially of an elastomer.

5. A valve member as recited in Claim 1, wherein said protrusion is formed substantially of rubber.

6. A valve member as recited in Claim 1, wherein said protrusion has a hollow interior and said slit is arranged at an end of the protrusion remote from said sheet.

7. A valve member as recited in Claim 1, wherein the protrusion has side walls converging in a direction towards said slit.

8. A valve member as recited in Claim 1, wherein said aperture is arranged substantially centrally of said sheet.

9. A feeding bottle, comprising:

(a) a hollow body having a first end adapted to receive a teat and a second end remote from said first end; and

(b) an air inlet valve arranged in use at said second end, wherein the air inlet valve comprises:

(1) a rigid retaining member for accommodating

(2) a valve member comprising:

(a) a resiliently deformable sheet having an aperture from a first side to a second side of the sheet,

(b) a protrusion on said sheet, and

(c) a slit in said protrusion, forming said aperture, said slit adapted to open and close in response to a pressure differential across said sheet,

wherein said retaining member has a plate member with an aperture corresponding to the aperture in the valve member.

10. A feeding bottle as recited in Claim 9, wherein said corresponding aperture in said plate member is arranged to prevent ingress of larger foreign objects.

11. A feeding bottle as recited in Claim 10, wherein said corresponding aperture in said plate member has a central disc member and comprises several arcuate aperture portions.

12. A feeding bottle as recited in Claim 9, further comprising protection means for protecting the retaining member and/or valve member from the environment.

13. A feeding bottle as recited in Claim 12, wherein said protection means comprises a substantially cylindrical member adapted to slidably fit over the retaining member.

14. A feeding bottle as recited in Claim 13, wherein the retaining member has a protruding portion adapted to abut against the protection means.

15. A feeding bottle as recited in Claim 9, wherein said first and second ends each have a respective axis and wherein the axis of the first end extends at an angle to the axis of the second end.

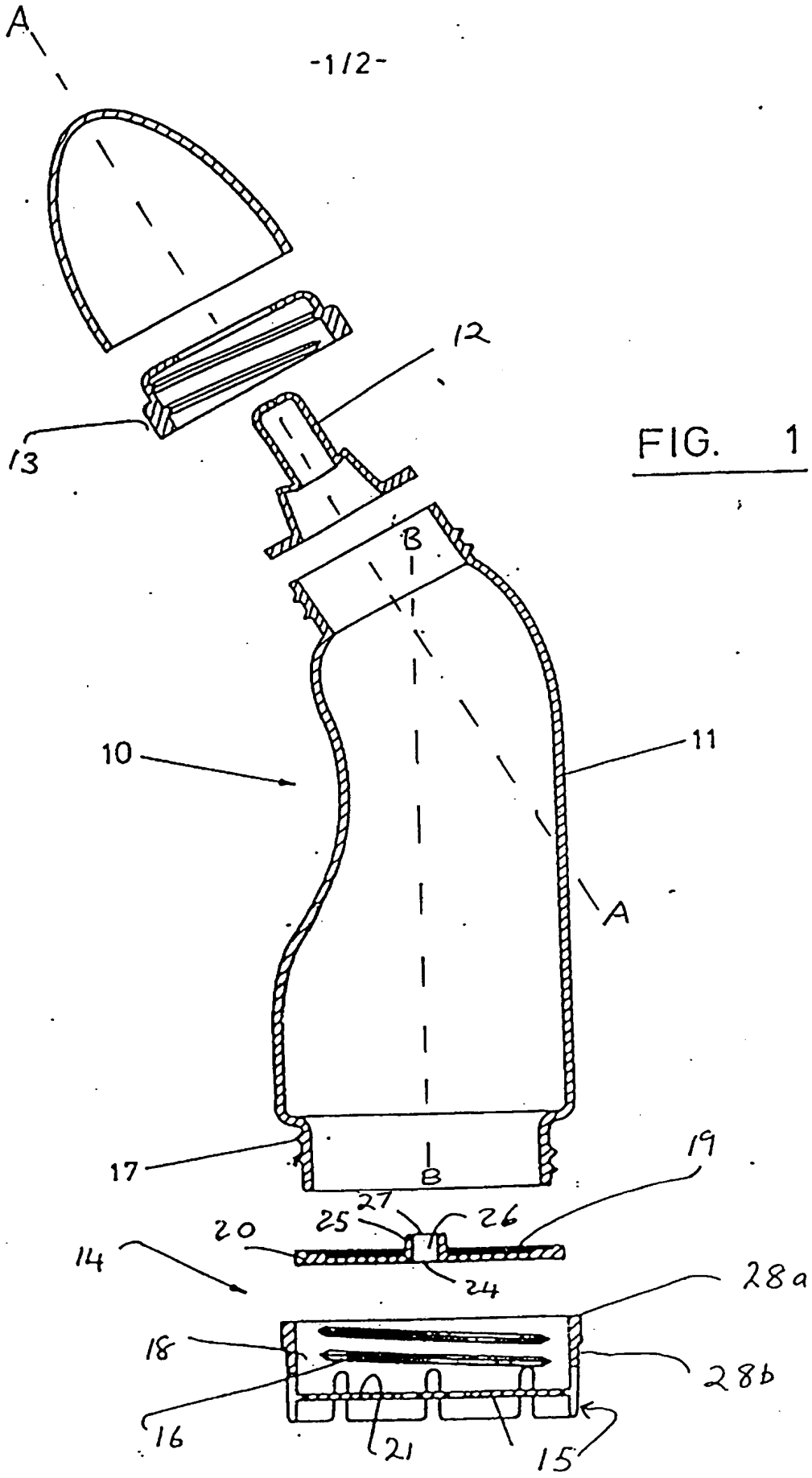


FIG. 1

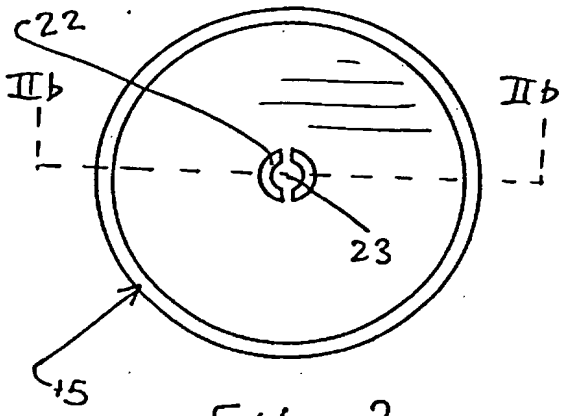


FIG. 2a

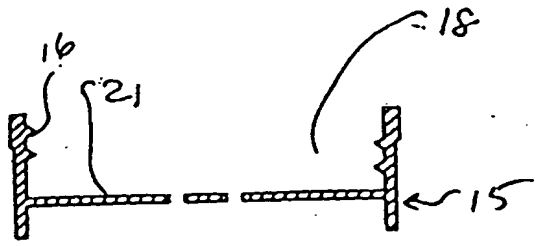


FIG 2b

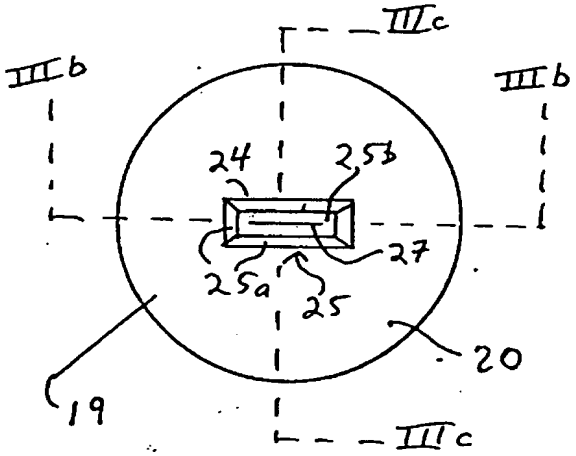


FIG 3a

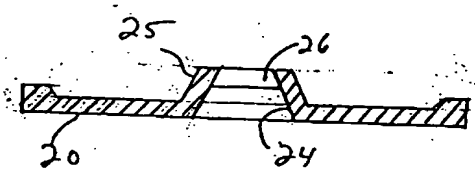


FIG 3b

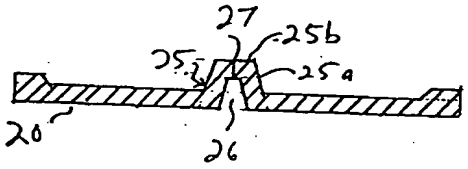


FIG 3c

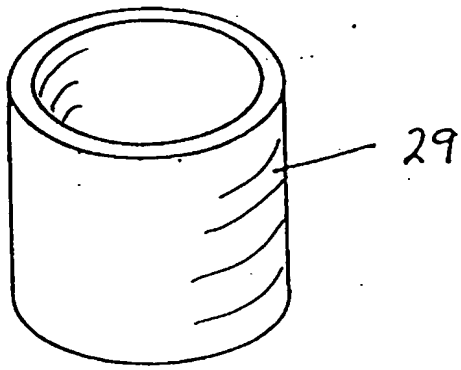


FIG. 4